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Noise Impact Assessment...

British Standard 8233: 2014

Reason for Refusal 6 to Planning Application 36678/APP/2017/1774

Project Name: General Foods
Site Reference: KS03934
Site Address: 3 Viveash Close, Hayes, Middlesex, UB3 4RY.

Client: General Foods Trading Limited

Version Control...

Reference: KR06425
Version: v1.0
Date: 7th December 2018
Status: Current document for issue

Author: Mr. R. M. Scrivener, MSc, MIOA
Position: Consultant
Date: 7th December 2018

Signed:

A handwritten signature in brown ink, appearing to be 'R. M. Scrivener'.



Report Conclusion...

The mitigation measures included within the development will ensure the future occupiers of the 68 residential dwellings will be exposed to acceptable internal and external amenity noise levels. The development complies in full with policies EM8, OE1 and OE3 of the Local Plan and the general guidance within the National Planning Policy Framework 2018.

The mitigation measures include:

- Glazing: Standard Double Glazed Unit (10mm float – 16mm Gap – 6.4 PVB).
- Ventilation: Full MVHR system to comply with Approved Document F.

This report provides the additional information referenced in the planning officers report justifying the delegated decision by providing details of the surrounding commercial uses and the maximum noise levels which are likely to impact the proposed site. These additional assessments have not changed the conclusion of the original report that in terms of noise the site is an acceptable location for residential development.

Version History...

Reference	Version	Date	Author	Position	Document Status
KR06425	V1.0	07/12/18	R Scrivener	Consultant	Current document for issue
Details	Initial issue of document for client comment				

Report Limitations...

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1. Executive Summary...

1.1. Introduction

1.1.1 Instruction

KR Associates have been instructed to undertake a noise impact assessment to support the re-application and appeal of the planning refusal for the construction of 68 residential dwellings on the former General Foods Trading building in Viveash Close in Hayes Middlesex to determine if the internal and external amenity noise levels will be acceptable.

1.1.2 Scope of Report

Planning permission for the demolition of the existing buildings (Use Class B8) and the redevelopment of the site to 68 residential dwellings (Use Class C3) 1,620m² of commercial floor space (Use Class B1) was refused by the London Borough of Hillingdon under reference 36678/APP/2017/1774 on 18th October 2018.

“Reason 6 - In the absence of a comprehensive noise report, the applicant has failed to demonstrate that the development will not have an unacceptable impact on future and neighbouring occupants by way of noise and disturbance. The proposal is therefore contrary to Policy EM6 of the Hillingdon Local Plan: Part One - Strategic Policies (November 2012) and Policies OE1 and OE3 of the Hillingdon Local Plan: Part Two Saved UDP Policies (November 2012)”

1.2. Executive Support of Report

1.2.1 Site Description (Section 2)

The existing General Foods Trading company building is located at the end of Viveash Close with a railway line to the north and commercial properties to the south and west of the site.

1.2.2 Measured Background Noise Levels (Section 3)

Background measurements were undertaken between Friday 16th November to Thursday 22nd November 2018 at three positions.

Results	Day Time	Night Time	Commentary
Position 1	L _{Aeq} , 16 hour 67 dB	L _{Aeq} , 8 hour 64 dB	Representative level in context of site
Position 2	L _{Aeq} , 16 hour 67 dB	L _{Aeq} , 8 hour 51 dB	Industrial noise from adjoining unit
Position 3	L _{Aeq} , 16 hour 64 dB	L _{Aeq} , 8 hour 62 dB	Representative level in context of site

1.2.3 3D Noise Map of Site (Section 4)

A noise map was created using the data from Heathrow airport and the Department for Transport strategic noise maps and the measurements of the industrial noise to the south.

Results	Day Time	Night Time	Commentary
Position 1	L _{Aeq} , 16 hour 67 dB	L _{Aeq} , 8 hour 64 dB	Predominantly railway noise
Position 2	L _{Aeq} , 16 hour 67 dB	L _{Aeq} , 8 hour 51 dB	Predominantly industrial noise
Position 3	L _{Aeq} , 16 hour 56 dB	L _{Aeq} , 8 hour 54 dB	Predominantly railway noise

1.2.4 Proposed Site Criterion (Section 5)

It would be recommended that the internal and external noise levels comply with the following criterion to meet the policies EM8, OE1 and OE3 in the London Borough of Hillingdon Local Plan.

Location	Day Time	Night Time	Commentary
Bedroom	L _{Aeq} ,16h inside 35 dB	L _{Aeq} , 8h, inside 30 dB	Based on BS 8233: 2014 Criterion
	--	L _{AMAX} , 8h, inside 42 dB	Based on Defra Document
Amenity	L _{Aeq} ,16h,outside 55 dB	--	Based on NNGL
LOAEL	L _{Aeq} ,16h,outside 56 dB	L _{Aeq} ,16h,outside 46 dB	Based on Defra AECOM Report
SOAEL	L _{Aeq} ,16h,outside 66 dB	L _{Aeq} ,16h,outside 56 dB	

1.2.5 ProPG Stage 1 - Site Assessment (Section 6)

The site assessment undertaken in accordance with the ProPG indicates a “High Risk” site in terms of noise

Results	Day Time	Night Time	Commentary
Existing Levels	L _{Aeq} , 16h, outside 71 dB	L _{Aeq} , 8h, outside 65 dB	+/- 2.5 dB (95% Confidence, k = 2)
ProPG Risk	High Risk	High Risk	Stage 1 Noise Risk Assessment
Impact	>SOAEL	>SOAEL	NPPF Assessment of Existing Levels

1.2.6 ProPG Stage 2 – Internal Noise Levels (Section 7)

The assessment of internal noise levels with the windows closed and the mechanical ventilation providing the airflow requirements of Approved Document F are detailed in the table below.

Time Period	Day Time (07:00 to 23:00)		Night Time (23:00 to 07:00)	
Measurement Index	Maximum	Average	Maximum	Average
Windows Closed, $L_{eq,2}$	$L_{Max,16\text{ hour}}$ 50 dB	$L_{Aeq,16\text{ hour}}$ 33 dB	$L_{Max,8\text{ hour}}$ 45 dB	$L_{Aeq,8\text{ hour}}$ 27 dB
Criterion	--	$L_{Aeq,16\text{ hour}}$ 35 dB	$L_{Max,8\text{ hour}}$ 42 dB	$L_{Aeq,8\text{ hour}}$ 30 dB
Compliance	--	Yes	Yes	Yes

1.2.7 ProPG Stage 2 – External Amenity Levels (Section 7)

The amenity areas include covered balconies with glass panels to achieve the required amenity noise levels in this noisy location.

Octave Frequency	Day Time (07:00 to 23:00)	Night Time (23:00 to 07:00)
External Levels, $L_{eq,3}$	$L_{Aeq,16\text{ hours, inside}}$ 52 dB	$L_{Aeq,8\text{ hours, inside}}$ 44 dB
Criterion	$L_{Aeq,16\text{ hour}}$ 55 dB	--
Compliance	Yes	--

1.3. Conclusion

The mitigation measures included within the development will ensure the future occupiers of the 68 residential dwellings will be exposed to acceptable internal and external amenity noise levels. The development complies in full with policies EM8, OE1 and OE3 of the Local Plan and the general guidance within the National Planning Policy Framework 2018.

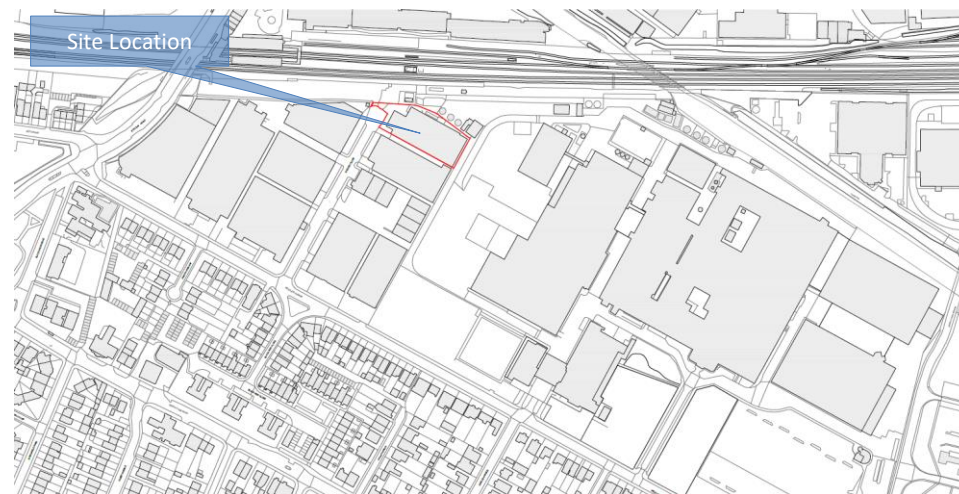
The mitigation measures include:

- Glazing: Standard Double Glazed Unit (10mm float – 16mm Gap – 6.4 PVB).
- Ventilation: Full MVHR system to comply with Approved Document F.

2. Site Description...

2.1. Site Location

The existing General Foods Trading company building is located at the end of Viveash Close opposite the entrance to the railway car park. The building is a steel frame and metal clad building with a 2-storey office block and loading bay at the front and a single storey warehouse at the rear.



Latitude:	51.502389 °	Longitude:	-0.418174 °	Elevation:	12 m
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The site is located within an existing small trading estate in Viveash Close with other commercial properties in similar style buildings to the south and west of the site. There is a high-speed railway line that runs along the northern boundary of the site and a large commercial complex which is currently being demolished as part of the wider development plans for the area.

2.2. Proposed Development

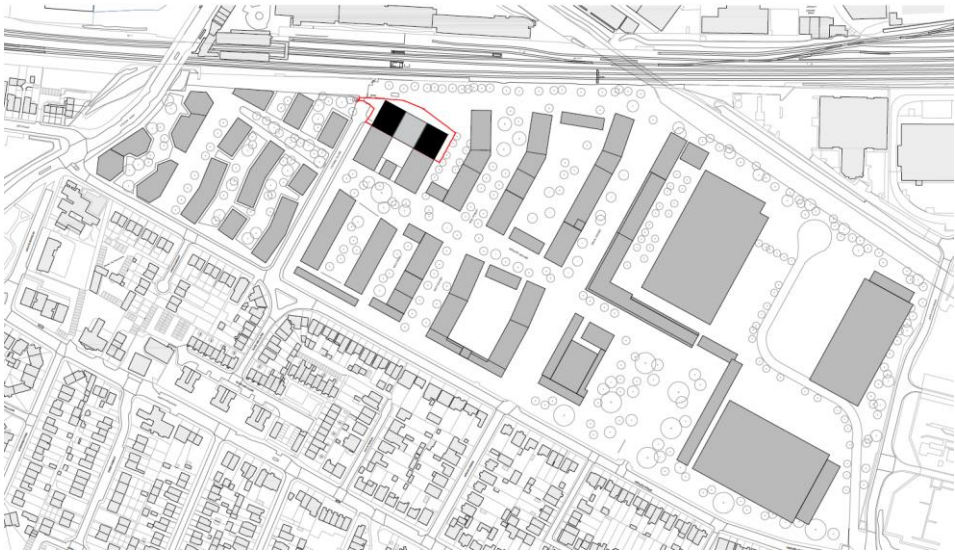
2.2.1 Description of Development on Site

The proposed development on the former General Foods Trading Company site at 3 Viveash Close will consist of:

“Demolition of the existing building (Use Class B8) and the redevelopment of the site to include the erection of a part 8, part 10 storey building linked by podium level comprising 68 residential units (21 x 1 bedroom, 24 x 2 bedroom and 23 x 3 bedroom) (Use Class C3) and 1620 m2 commercial floorspace at ground, mezzanine and first floor levels (Use Class B1) with associated parking and landscaping”

2.2.2 Wider Development

The proposed development at 3 Viveash Close forms a wider development of the local area which consists of developing more residential dwellings very similar to the existing dwellings that are located on the northern side of the existing railway line.



2.2.3 Drawings

A full set of drawings have been submitted with the planning application but for reference the key documents are replicated below with the relevant drawings number for reference.



Details:	Perspective View of Development (looking from the North East towards the site)				
Architect:	FBM Architects	Drawing No.	897/P/5001A	Date:	17/01/2018

3. Existing Background Noise Levels...

3.1. Measurement Details

3.1.1 Measurement Location

Background measurements were undertaken at three measurement locations around the site between Friday 16th November to Thursday 22nd November 2018 to determine the existing noise climate from the railway line to the north and the other commercial operations to the south.



Location 1	Latitude:	51.502552°	Longitude:	-0.418670°	Elevation:	18 m
Location 2	Latitude:	51.502277°	Longitude:	-0.418413°	Elevation:	18 m
Location 3	Latitude:	51.502164°	Longitude:	-0.417707°	Elevation:	18 m

3.1.2 Photographs of Meter Installations



Location 1 (Front of Site)

Location 2 (Side of Site)

Location 3 (Rear of Site)

3.1.3 Measurement Location 1 – Equipment Calibration

Meter 1	Meter	Microphone	Calibrator
	KRE/086/01	KRE/086/04	KRE/086/02
Manufacturer	Casella	Casella	Casella
Serial Number	2145360	00709	5231002
Certificate Number	U24420	24419	U27852
Calibration Date	12 th January 2017	12 th January 2017	21 st February 2018

3.1.4 Measurement Location 2 – Equipment Calibration

Meter 2	Meter	Microphone	Calibrator
	KRE/089/01	KRE/089/04	KRE/089/02
Manufacturer	Casella	Casella	Casella
Serial Number	2145391	00092	5230902
Certificate Number	U24414	24413	U27851
Calibration Date	12 th January 2017	12 th January 2017	21 st February 2018

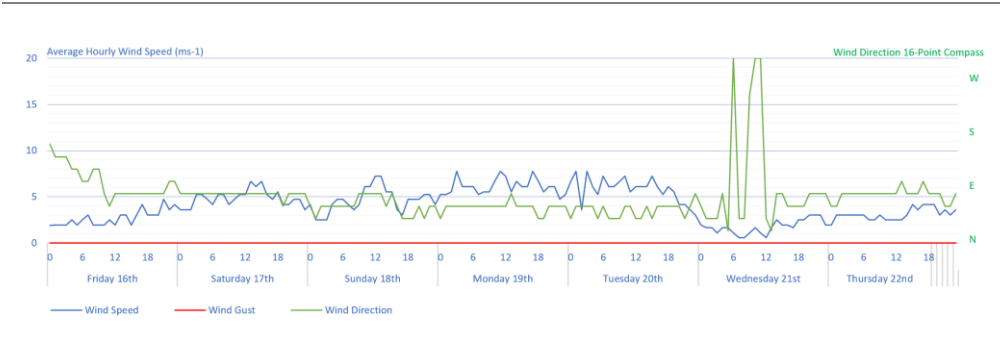
3.1.5 Measurement Location 3 – Equipment Calibration

Meter 3	Meter	Microphone	Calibrator
	KRE/088/01	KRE/088/04	KRE/088/02
Manufacturer	Casella	Casella	Casella
Serial Number	2145356	00598	5231003
Certificate Number	U24417	24416	U27850
Calibration Date	12 th January 2017	12 th January 2017	21 st February 2018

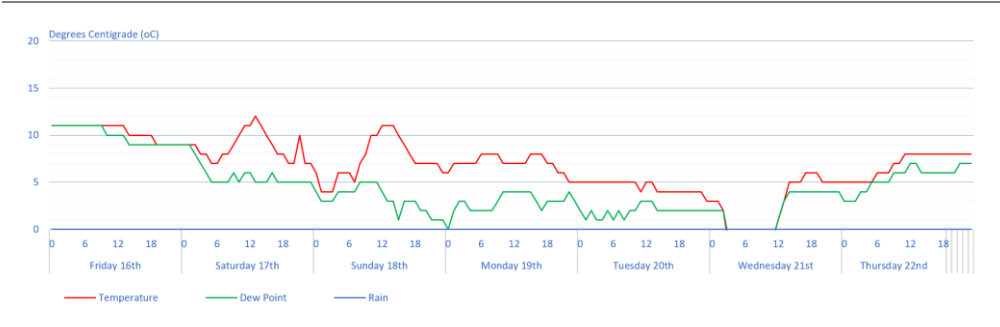
3.2. Prevailing Weather Conditions

The following data is taken from the Weather Underground site using a website API. The weather station was located at Heathrow.

3.2.1 Wind Speed and Direction



3.2.2 Temperature, Dew Point and Rainfall



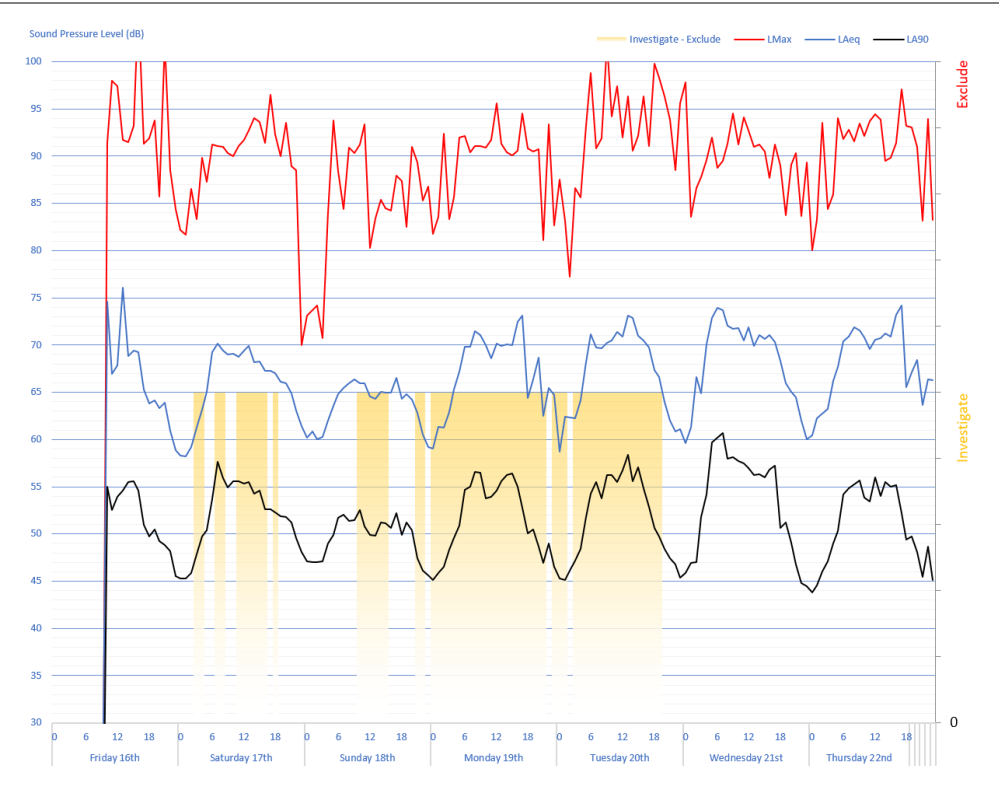
3.2.3 Impact of Weather

An analysis of the results indicate that the prevailing weather conditions did not adversely impact the background noise measurements and there were no technical reasons why any part of the background measurements should be excluded from the overall noise levels.

It should be noted that noise data is examined when the wind speed is above 5 ms⁻¹ or the rainfall is above 0.0mmh⁻¹ and excluded when the wind speed is above 10 ms⁻¹ or the rainfall is above 0.3mmh⁻¹. The exclusions are shown in the noise monitoring profiles within the next section.

3.3. Measurement Results

3.3.1 Measurement Position 1

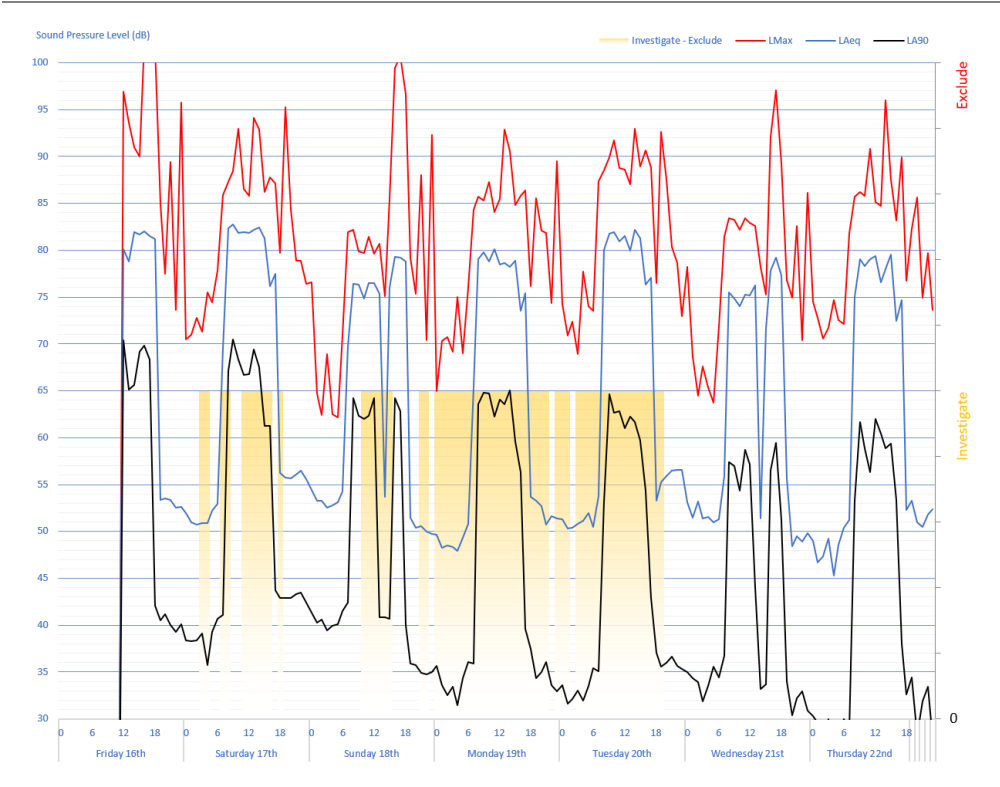


Day Time (07:00 to 23:00)			Night Time (23:00 to 07:00)		
L _{Amax} , 1 hour	L _{Aeq} , 1 hour	L _{A90} , 1 hour	L _{Amax} , 1 hour	L _{Aeq} , 1 hour	L _{A90} , 1 hour
80 dB - 106 dB	61 dB - 76 dB	45 dB - 61 dB	70 dB - 99 dB	58 dB - 74 dB	44 dB - 60 dB

The following table are the overall noise levels for the day time and night time periods with the excluded data removed as a detailed in the above profile.

Location	Day Time	Night Time	Commentary
Position 1	L _{Aeq} ,16h outside 67 dB	L _{Aeq} , 8h,i,outside 64 dB	Based on BS 8233: 2014 Criterion
	--	L _{AMAX} , 8h, outside 92 dB	10-event Maximum

3.3.2 Measurement Position 2

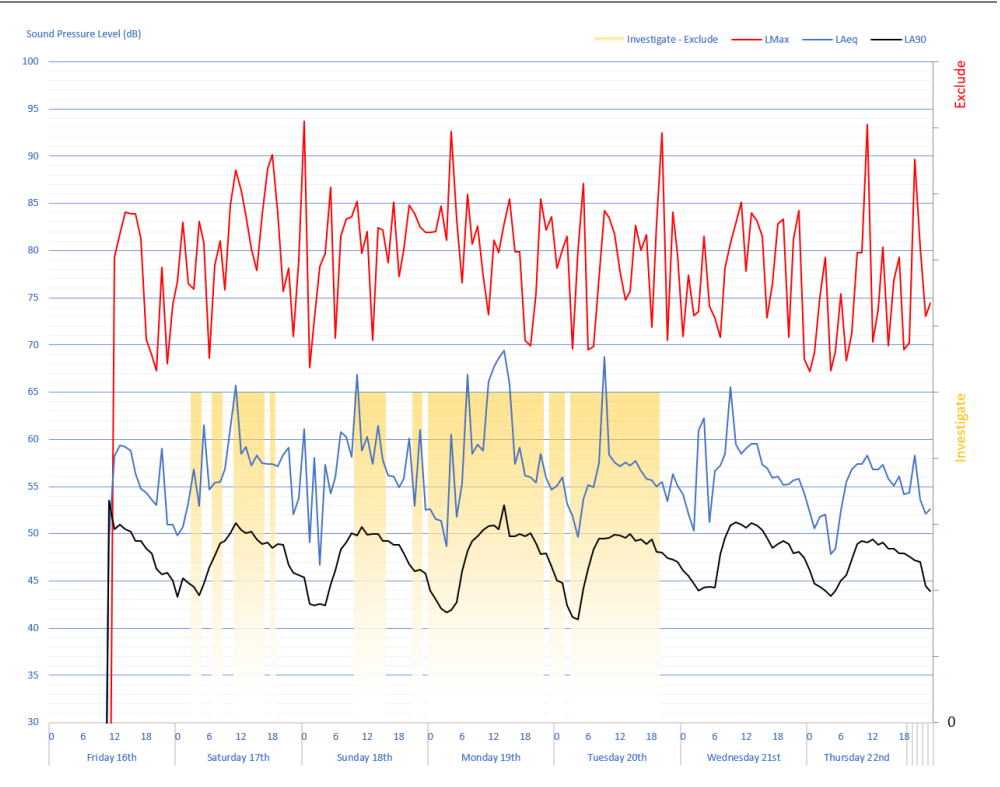


Day Time (07:00 to 23:00)			Night Time (23:00 to 07:00)		
L _{Amax} , 1 hour	L _{Aeq} , 1 hour	L _{A90} , 1 hour	L _{Amax} , 1 hour	L _{Aeq} , 1 hour	L _{A90} , 1 hour
70 dB - 102 dB	48 dB - 83 dB	28 dB - 71 dB	62 dB - 96 dB	45 dB - 57 dB	24 dB - 42 dB

The following table are the overall noise levels for the day time and night time periods with the excluded data removed as a detailed in the above profile.

Location	Day Time	Night Time	Commentary
Position 2	L _{Aeq} ,16h outside 67 dB	L _{Aeq} ,8h,ioutside 51 dB	Based on BS 8233: 2014 Criterion
	--	L _{AMAX} , 8h, outside 87 dB	10-event Maximum

3.3.3 Measurement Position 3



Day Time (07:00 to 23:00)			Night Time (23:00 to 07:00)		
L _{Amax} , 1 hour	L _{Aeq} , 1 hour	L _{A90} , 1 hour	L _{Amax} , 1 hour	L _{Aeq} , 1 hour	L _{A90} , 1 hour
67 dB - 93 dB	52 dB - 69 dB	45 dB - 54 dB	67 dB - 94 dB	47 dB - 62 dB	41 dB - 47 dB

The following table are the overall noise levels for the day time and night time periods with the excluded data removed as a detailed in the above profile.

Location	Day Time	Night Time	Commentary
Position 3	L _{Aeq} ,16h outside 56 dB	L _{Aeq} , 8h,ioutside 54 dB	Based on BS 8233: 2014 Criterion
	--	L _{AMAX} , 8h, outside 83 dB	10-event Maximum

4. 3D Noise Map of Site...

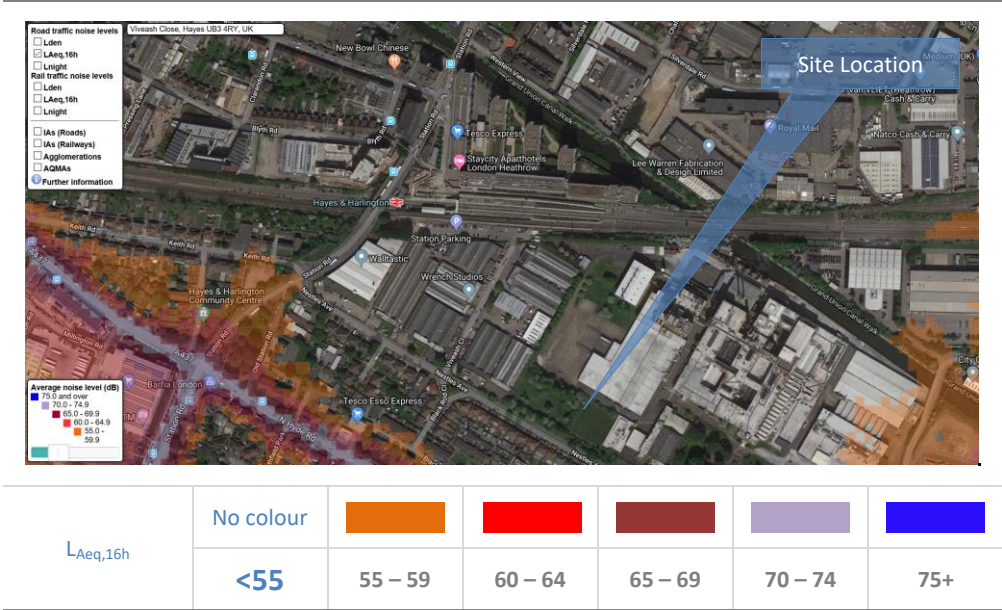
4.1. Certified Input Sources

In order to determine the impact of the existing noise sources on all parts of the façade of the proposed residential dwelling and on the external amenity area it is necessary to create a 3D noise map of the surrounding area. Where the data is available the noise map will use data supplied by the CAA for aircraft noise, Department for Transport for road and rail noise and the “Design Manual for Roads and Bridges – Volume 5 – Section 2 TA 79/99 A1” for other roads.

4.1.1 Aircraft Noise

The site is located directly to the north of the two main runways at Heathrow airport. The Civil Aviation Authority published it report entitled “Heathrow Airport 2016 Summer Noise Contours and Noise Action Plan Contours – ERCD Report 1701” in 2017 which includes an overall noise map. Though the site is close to Heathrow it falls outside the daytime 54 dB(A) contour.

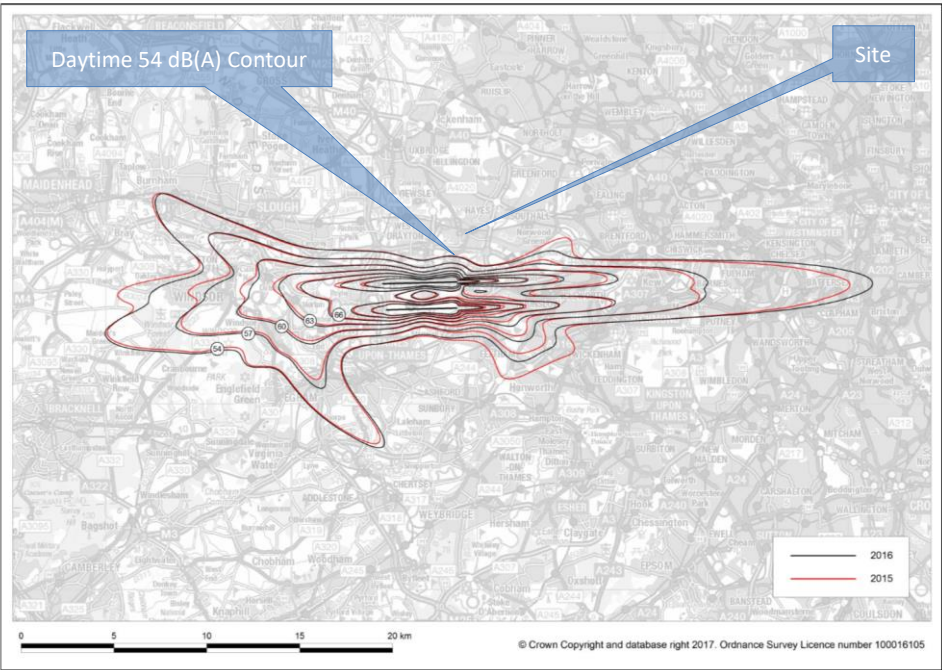
4.1.2 Road Noise - Day Time (Strategic Noise Map)



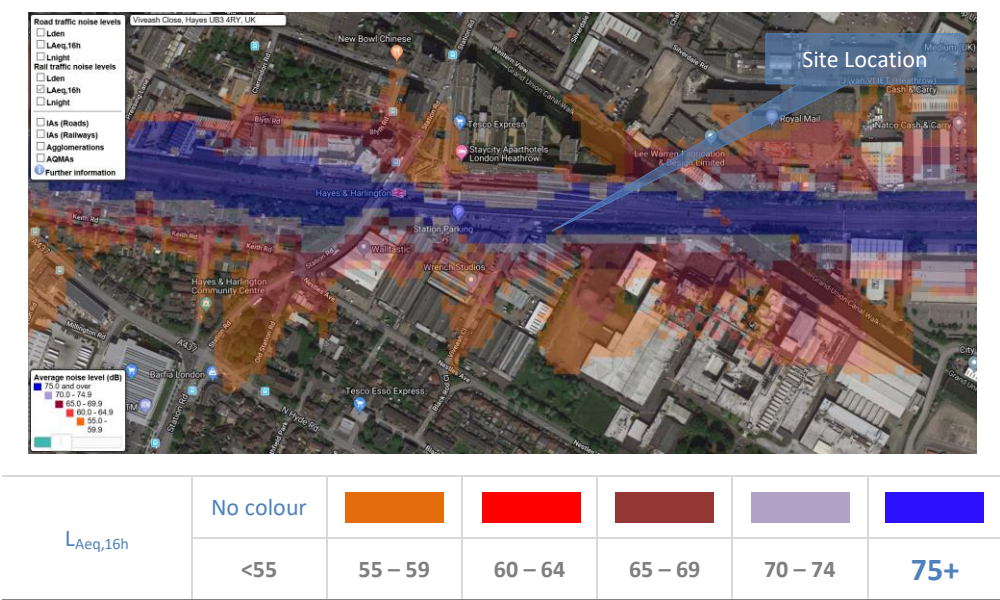
4.1.3 Road Noise - Night Time (Strategic Noise Map)



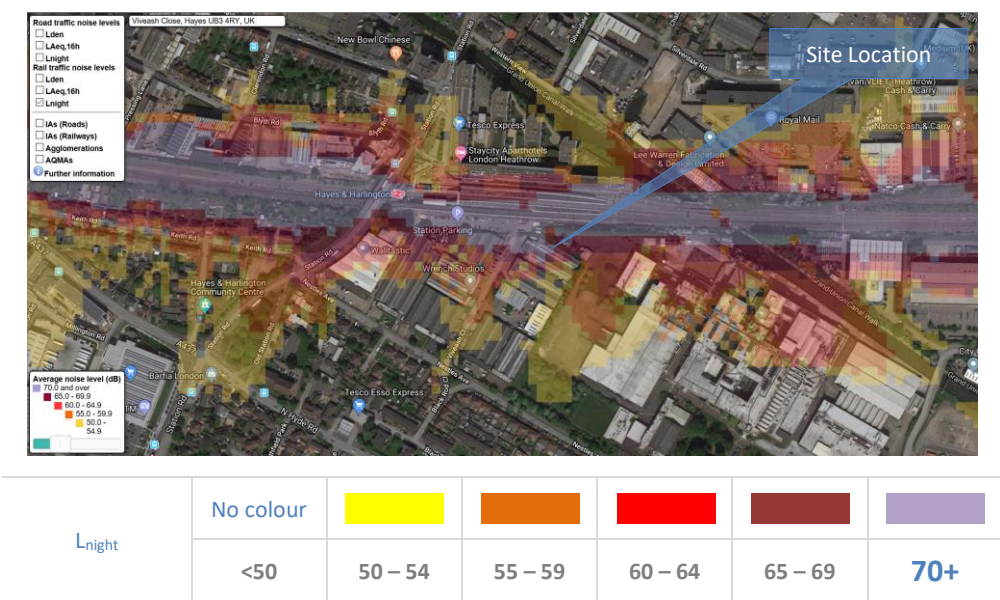
Figure B3 Heathrow 2016 and 2015 average summer day 54-72 dBA actual modal split Leq noise contours



4.1.4 Rail Noise - Day Time (Strategic Noise Map)



4.1.5 Rail Noise - Night Time (Strategic Noise Map)



4.2. Uncertified Input Sources

4.2.1 Design Manual for Roads and Bridges

Part 3 of the “*Design Manual for Roads and Bridges TA 79/99 (Amendment 1)*” provides the following designation of urban roads which is used to enter reasonable traffic flows into the noise map where data is not available from the Department for Transport.

Type	Description	Speed	Capacity (vph)	Noise Levels – Lp(25m)	
				Day	Night
UC	Residential Road	20 mph	50 – 200 vph	58 dB(A)	52 dB(A)
UAP4	High Street – Loading	30 mph	750 – 1,410 vph	68 dB(A)	65 dB(A)
UAP3	Standard Road	40 mph	900 – 1,620 vph	69 dB(A)	67 dB(A)
UAP2	Standard Road (2skm ⁻¹)	40 mph	1,020 – 4,800 vph	74 dB(A)	67 dB(A)
UAP1	Standard Road (0skm ⁻¹)	60 mph	1,020 – 5,200 vph	77 dB(A)	70 dB(A)
UM	Motorway (0skm ⁻¹)	60 mph	4,000 – 7,200 vph	79 dB(A)	76 dB(A)

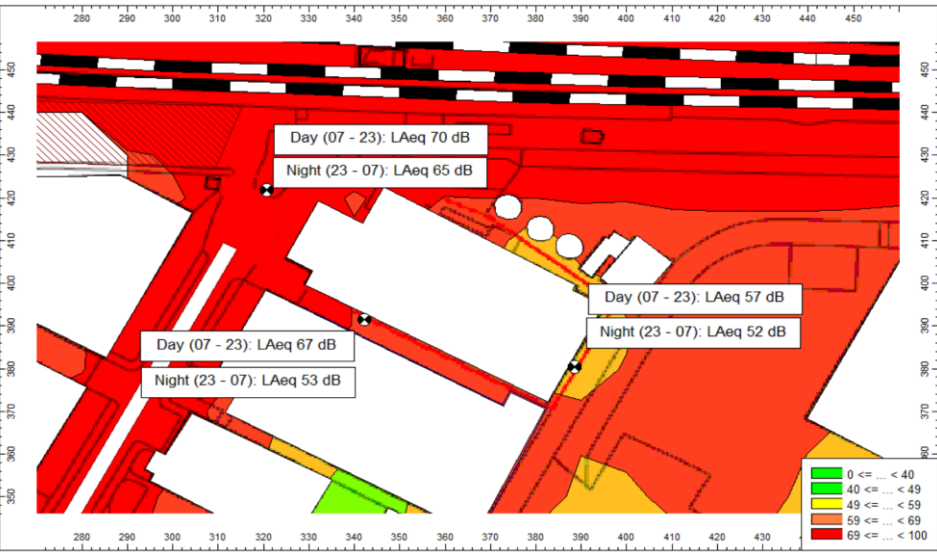
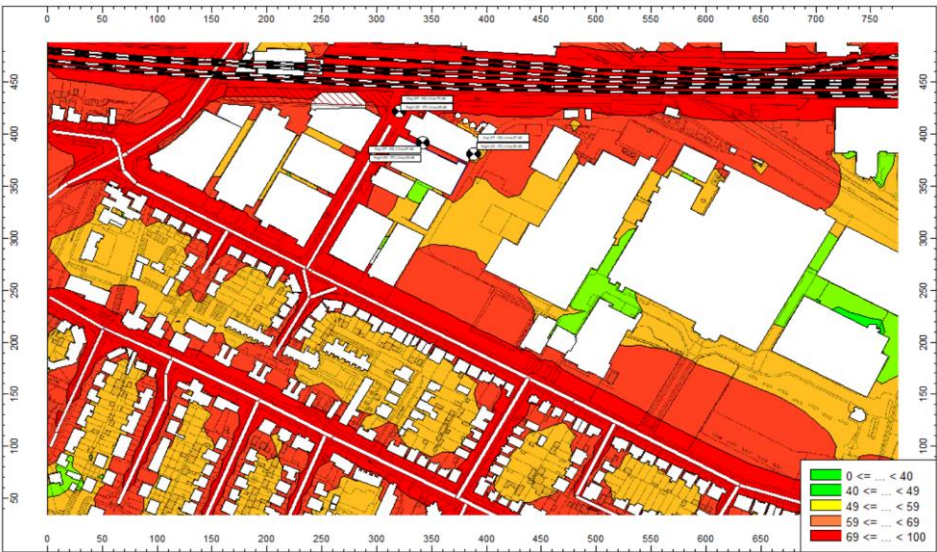
4.2.2 Summary of Inputs to Noise Map

The full inputs arrays for the CadnaA noise map area available but the following table details the outline values for all air, rail and road sources.

Source	Type	Description	Rates (No / Hour)		Noise Levels – Lp(25m)	
			Day	Night	Day	Night
Air	CAA	Airport Noise Contours	--	--	<54 dB(A)	<54 dB(A)
Road	DfT	Noise Map Bands	--	--	<55 dB(A)	<54 dB(A)
Rail	DfT	Noise Map Bands	--	--	75+ dB(A)	70+ dB(A)
Road	UPAP4	Other Local Roads	1,000	200	64 dB (A)	60 dB(A)

4.3. 3D Noise Map of Existing Site

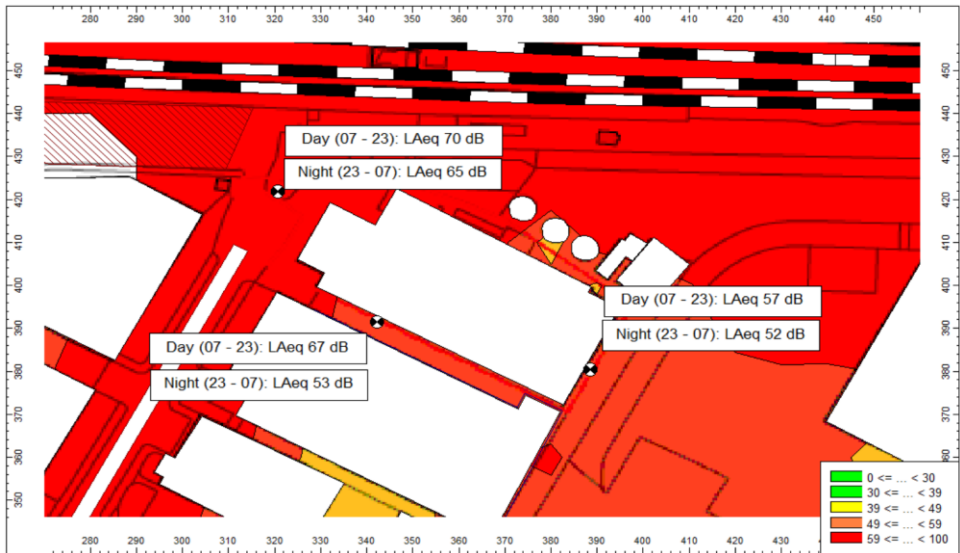
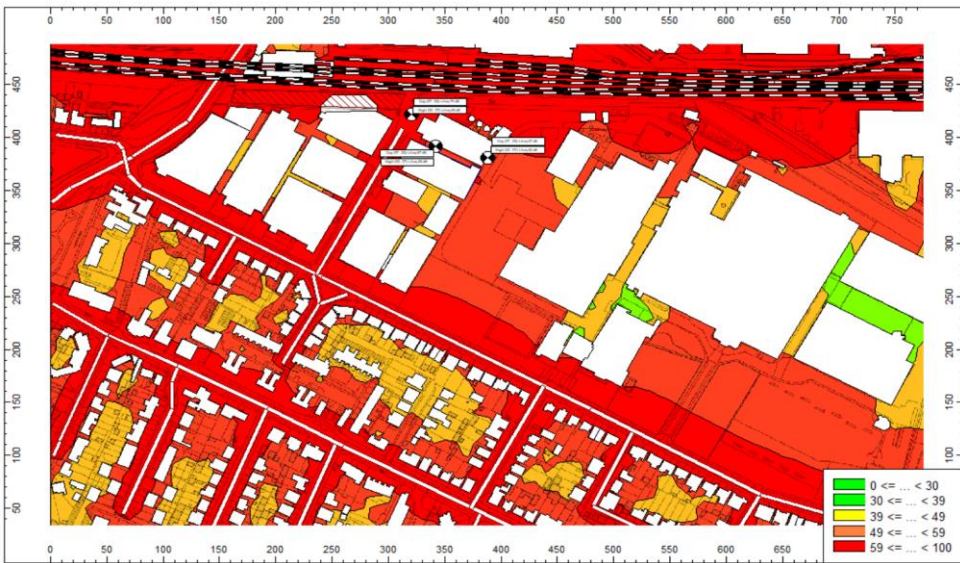
4.3.1 Day Time (07:00 to 23:00)



LAeq,16h				
	40 – 49	50 – 59	60 – 69	70+

10m Grid at a height of 4m above the ground level

4.3.2 Night Time (23:00 to 07:00)



LAeq,16h				
	30 – 39	40 – 49	50 – 59	60+

10m Grid at a height of 4m above the ground level

4.3.3 Validation of Noise Maps

The above noise maps have been created using the published data from contours created by the CAA, the strategic noise maps from the Department for Transport and the classification of roads from the Design Manual for Roads and Bridges (urban carriage ways). To ensure the noise map is producing representative noise levels across the site the following comparison is made of the day time and night time noise level at the background measurement position.

Results	Day Time	Night Time	Commentary
Measured	L _{Aeq} , 16 hour 67 dB	L _{Aeq} , 8 hour 64 dB	Corrected Average Measured Levels.
Noise Map	L _{Aeq} , 16 hour 70 dB	L _{Aeq} , 8 hour 65 dB	Calculated Levels from Noise Map.
Difference	+3 dB	+1 dB	Very Accurate Noise Map

The noise map has accurately predicted the day time and night time background noise levels at the measurement position and therefore it reasonable to assume it can be relied upon to accurately predict the existing noise levels across the site.

For robustness the following calculations are based on the slightly higher day and night time levels as this give an addition margin of security as the week long measurements at three positions may not have captured all the possible events within a year that could on occasions result in higher noise levels.

5. Criterion...

5.1. National Planning Policy

5.1.1 National Planning Policy Framework 2018

The revised *National Planning Policy Framework* published in 2018 provides an assumption in favour of sustainable development that meets the three overarching objectives: economic, social and environmental. Paragraph 11 provides guidance for decision makers:

“For decision-taking means:...
c) approving development proposals that accord with an up-to-date development without delay; or
d) ...granting permission unless...
i) the application of polies in this Framework... provides a clear reason for refusing development proposal; or
ii) any adverse impacts of doing so would significantly and demonstrably outweigh the benefits.

Paragraph 170 of the NPPF provides the following guidance on conserving and enhancing the natural environment in terms of noise:

“Planning policies and decisions should contribute to and enhance the natural and local environment by:
e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of ...noise pollution...”

Paragraph 180 of the NPPF requires the development to be appropriate for its location:

“Planning... decisions should also ensure that new development is appropriate for its location...
a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development - and avoid noise giving rise to significant adverse impacts on health and the quality of life ⁶⁰
b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value...

⁶⁰ See Explanatory Note to the Noise Policy Statement for England: 2010”

5.1.2 Noise Policy Statement for England: 2010

The *Noise Policy Statement for England* ⁽²⁾ was published in 2010 defines three aims:

“**Avoid** significant adverse impact on health and the quality of life;
Mitigate and minimise adverse impacts on health and quality of life; and
Contribute to the improvement of health and the quality of life.”

The NPSE defines significant adverse and adverse impact in terms of noise:

“**NOEL – No Observed Effect Level** – This is the level of noise below which no effect can be detected.
LOAEL – Lowest Observed Adverse Effect Level - This is the level above which adverse effects on health and quality of life can be detected.
SOAEL – Significant Observed Adverse Effect Level -This is the level above which significant adverse effects on health and quality of life occur.”

5.1.3 Planning Practice Guidance: 2014

The *Planning Practice Guidance – Noise* ⁽³⁾ last updated in 2014 is an online resource published by the Ministry of Housing, Communities and Local Government and provides specific advice on the NPPF and NPSE.

The NPPG expands the concept of effect levels and provides a useful table on the link between the effect, perception and typical outcomes.

Effect	Perception	Typical Outcomes
NOEL	Not Noticeable	No effect
	Noticeable & Not Intrusive	Audible, small behaviour change
LOAEL	Noticeable & Intrusive	Audible, behaviour change, Quality of Life Change
SOAEL	Noticeable & Disruptive	Dominant, Sleep disturbance.
	Noticeable & Very Disruptive	Extensive, Harmful Impact on Health

5.2. National / International Standards and Guidance

5.2.1 Night Noise Guidelines: 2009

The aim of the *Night Noise Guidelines* ⁽⁴⁾ published in 2009 was to update the *WHO – Guidelines for Community Noise* ⁽⁵⁾ published : 1999” and provide health-based guidelines for acceptable night time noise levels following the work previously undertaken for the *European Union Directive 2002/49/EC* ⁽⁶⁾ known as Environmental Noise Directive.

The NNGL provides the threshold levels above which an effect has been established with the underlying noise level.

Effect	Health Effects Observed in the Population	L _{AMax} , inside
NOEL	Biological Effect – Motility or onset of Motility	32 dB
LOAEL	Sleep Quality – Waking up in night or too early	42 dB

The report goes on to recommend the following thresholds that are based on the relationship between the night time noise levels and the effect on the person sleeping.

Effect	Health Effects Observed in the Population	L _{night} , outside
NOEL	Up to this level no biological effects are observed	30 dB
LOAEL	Effects on sleep, body movements, awakening	40 dB
SOAEL	Significant adverse health effects	> 55 dB

5.2.2 British Standard 8233: 2014...

British Standard 8233: 2014 entitled *Guidance on sound insulation and noise reduction for buildings* ⁽⁷⁾ provides general guidance on the control of noise in and around buildings. The standard relates to the design of new buildings or refurbished buildings undergoing a change of use and the impact of existing external noise levels.

Results	Day Time	Night Time	Commentary
Sleeping	35 dB L _{Aeq,16 hour}	30 dB L _{Aeq,16 hour}	7.7.2 of BS 8233:2014 (Internal Levels)
Amenity	55 dB L _{Aeq,16 hour}	--	7.7.3.2. of BS 8233:2014 (External Levels)

5.2.3 ProPG – Planning and Noise

The Association of Noise Consultants, the Institute of Acoustics and the Chartered Institute of Environmental Health produces a joint document entitled *ProPG: Planning and Noise – Professional Practice Guidance on Planning and Noise – New Residential Development: 2017* (8). The document provides guidance on the holistic approach to produce residential developments that meet with the current planning policy.

The initial Stage 1 Risk Assessment identifies the likely risks from the existing continuous noise sources without the mitigation measures in place and determines if an Acoustic Design Statement (“ADS”) is required.

Period	Noise Risk Assessment			
	Negligible	Low	Medium	High
Day Time (07:00 to 23:00)	40 – 49	50 – 59	60 – 69	70+
Night Time (23:00 to 07:00)	30 – 39	40 – 49	50 – 59	60+
Effect without Mitigation	NOAEL	Acceptable – Increased risk – ADS Required		

The Stage 2 Assessment provides a systematic consideration of the four key elements:

Element	Recommendation
1	Good Acoustic Design Process – Supplementary Document 1
2	Internal Noise Level Guidelines – Replicates BS 8233: 2014
3	External Amenity Area Noise Assessment – Replicates BS 8233: 2014
4	Assessment of Other Relevant Issues – Policy, compliance and design

An Acoustic Design Statement (“ADS”) is included to demonstrate that a stage 1 risk assessment and the four elements of stage 2 have been completed.

Following the ProPG approach will lead to one of the following four recommendations.

Reference	Objection	Recommendation
A	No objection on noise grounds	Grant consent without the need for conditions
B		Grant consent with suitable noise conditions
C	Objection on noise grounds	Refuse to avoid significant adverse impacts
D		Refuse to prevent unacceptable adverse impacts

5.2.4 Approved Document F: 2010 (Amended 2015)

Approved Document F1 Means of Ventilation: 2010 (Amended 2015) (9) provides details of how to comply with requirements F1 of the *Building Regulations 2010* (10).

“Means of Ventilation

F1(1). There shall be adequate ventilation provided for people in the building.”

The ventilation strategy must provide the following:

Ventilation Type	Description
Extract	Removal of high concentration of water vapour e.g. Bathrooms, kitchens
Whole Building	Provide fresh air and remove pollutants e.g. water vapour CO ₂ build up etc.
Purge	Removal of high concentrations of pollutants and water vapour e.g. painting, burnt toast etc.

The ventilation requirements are designed solely to provide fresh air to the building and remove pollutants such as moisture and CO₂.

“4.8 Ventilation may also provide a means to control thermal comfort but this is not controlled under the Building Regulations. Part L addresses minimising energy due to the effects of solar gain in summer”

Approved Document F requires selection of one of the following four ventilation systems.

System	System Type	Requirements
1	Background Ventilation	5,000mm ² area in each room
	Extract Ventilation	60 ls ⁻¹ Kitchen, 15 ls ⁻¹ Bathrooms
2	Passive Stack Ventilation	12,000mm ² area in each room
3	Continuous Mechanical Extract (MEV)	4 air changes per hour
4	Continuous Mechanical Supply and Extract with Heat Recovery (MVHR)	60 ls ⁻¹ Kitchen, 15 ls ⁻¹ Bathrooms 0.3 ls ⁻¹ per m ² of floor area

5.2.5 NANR 116 Open / Closed Window Research

The Building Performance Centre produced a document entitled *NANR116: Open / Closed Window Research – Sound Insulation through Ventilated Domestic Windows: 2007* ⁽¹¹⁾ for Napier University which details the results of the sound insulation through partially open windows.

Table 5.6 of NANR 116 provides the statistically derived sound insulation of the opening within the windows where the opening has an equivalent area of 0.2m²

Octave Band Centre Frequency (Hz)							D _{n,e,w}
63	125	250	500	1000	2000	4000	
20	14	14	16	14	17	19	16
Statistically derived Sound Insulation of Window Opening (dB)							

5.2.6 Defra – Possible Options for the Identification of SOAEL and LOAEL.

AECOM published the document entitled *Possible Options for the Identification of SOAEL and LOAEL in Support of NPSE* ⁽¹²⁾ dated 2014 on behalf of Defra.

The following criterion are based on the health effects of sleep only.

Effect	Health Effects Observed in the Population	Day Time	Night Time
		L _{Aeq, 16h, outside}	L _{night, outside}
LOAEL	Sleep - Predominantly Road Sources	56 dB	46 dB
	Sleep Predominantly Rail Sources	63 dB	55 dB
	Sleep - Predominantly Air Sources	52 dB	41 dB
SOAEL	Sleep - Predominantly Road Sources	66 dB	56 dB
	Sleep - Predominantly Rail Sources	72 dB	68 dB
	Sleep - Predominantly Air Sources	60 dB	53 dB

5.3. Local Plan and Planning Refusal

5.3.1 Local Plan

The London Borough of Hillingdon adopted its document entitled “*A Vision for 2026 – Local Plan: Part 1 – Strategic Policies*” in November 2012. This document contains policy EM8 which states:

“Policy EM8: Land, Water, Air and Noise.

Noise. The Council will investigate Hillingdon's target areas identified in the Defra Noise Action Plans, promote the maximum possible reduction in noise levels and will minimise the number of people potentially affected. The Council will seek to identify and protect Quiet Areas in accordance with Government Policy on sustainable development and other Local Plan policies. The Council will seek to ensure that noise sensitive development and noise generating development are only permitted if noise impacts can be adequately controlled and mitigated.”

London Borough of Hillingdon refer to this document as “*Hillingdon Local Plan: Part One – Strategic Policies (November 2012)*”.

The London Borough of Hillingdon adopted its document entitled “Unitary Development Plan Saved Policies” in 2007. This document contains policies OE1 and OE3 which relate to noise:

“OE1

Planning permission will not normally be granted for uses and associated structures which are, or are likely to become, detrimental to the character or amenities of surrounding properties or the area generally, because of:

i) the siting or appearance;

(ii) the storage or display of vehicles, goods, equipment or other merchandise;

(iii) traffic generation and congestion;

(iv) noise and vibration or the emission of dust, smell or other pollutants, unless sufficient measures are taken to mitigate the environmental impact of the development and ensure that it remains acceptable.”

OE3

Buildings or uses which have the potential to cause noise annoyance will only be permitted if the impact is mitigated within acceptable levels by engineering, lay-out or administrative measures.”

The London Borough of Hillingdon refers to this document as “Hillingdon Local Plan: Part Two Saved UDP Policies (November 2012)”

5.3.2 Decision Notice - Refusal

Planning permission for the demolition of the existing buildings (Use Class B8) and the redevelopment of the site to 68 residential dwellings (Use Class C3) 1,620m² of commercial floor space (Use Class B1) was refused by the London Borough of Hillingdon under reference 36678/APP/2017/1774 on 18th October 2018. Reason 6 relates to noise and states:

“In the absence of a comprehensive noise report, the applicant has failed to demonstrate that the development will not have an unacceptable impact on future and neighbouring occupants by way of noise and disturbance. The proposal is therefore contrary to Policy EM6 of the Hillingdon Local Plan: Part One - Strategic Policies (November 2012) and Policies OE1 and OE3 of the Hillingdon Local Plan: Part Two Saved UDP Policies (November 2012)”

5.3.3 Delegated Decision – Officers Report

The Local Authority determined the decision based on the delegated officers report and decision. The report included the following two references to noise.

“Summary

In the absence of detailed information, the applicant has failed to demonstrate that the development will not have an unacceptable impact on future and neighbouring occupants by way of noise and disturbance; and failed to address the issues relating to flood risk, in accordance with the National Planning Policy Framework and National Planning Practice Guidance.

ENVIRONMENTAL PROTECTION UNIT, NOISE:

The site is surrounded by railway noise to the north and industrial/commercial noise to the other elevations in a predominantly industrial location. There are concerns as to the suitability of the site for residential use. A noise impact assessment by KR Associates was included as part of the application. It appears the assessment only looked at railway noise with regards to the noise prediction maps. Mention is made of short term monitoring of other noise but was not included in the assessment. There is concern over other uses around the site includes car repair which will have an element of impulsive noise such as hammering which needs to be included in any assessment. The noise assessment only looked at internal noise level but no assessment of the amenity areas have been made. Also the internal noise levels were assessed in terms of LAeq and not LMax. It is recommended a further assessment is made to include LMax. This application fails to satisfactorily consider noise from the surrounding area and its impact on future occupants.”

5.3.4 Discussion of Refusal

The reason for refusal number 6 incorrectly refers to policy EM6, which is about flood risk and not the policy EM8 which relates to noise. However, the reason for refusal does correctly reference policies OE1 and OE3 of the “Hillingdon Local Plan: Part Two Saved UDP Policies (November 2012)”

During the original planning application process discussions with the Local Authority resulted in an amended noise impact assessment being produced. It would appear in the delegated decision that the case officer has ignored these discussions and only relied on the original noise impact assessment.

5.4. Proposed Noise Criterion

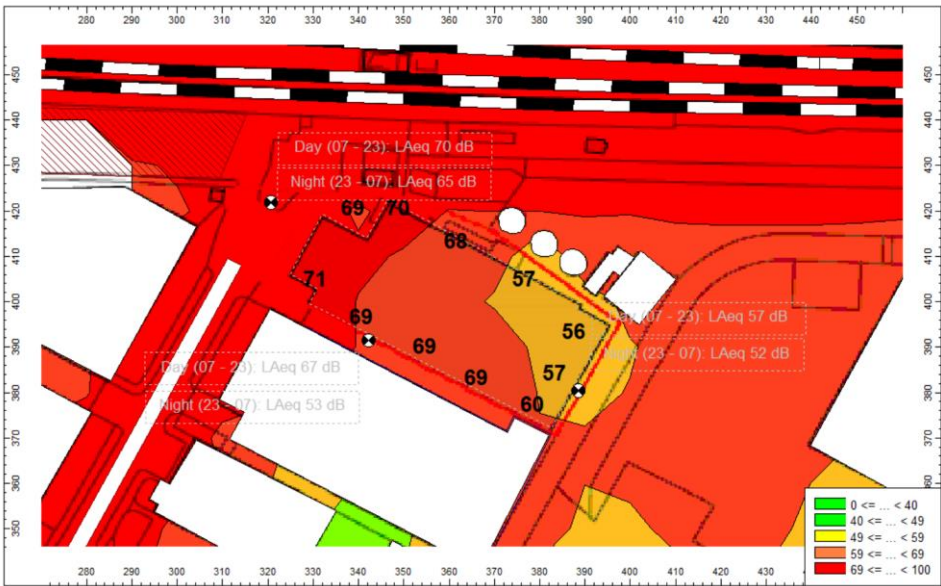
With consideration to the above documents it is considered appropriate to assess the proposed development against the following criterion. The criterion is assumed to be the threshold for the Lowest Observed Adverse Effect Level (“LOAEL”).

Location	Day Time	Night Time	Commentary
Bedroom	L _{Aeq} ,16h inside 35 dB	L _{Aeq} , 8h,inside 30 dB	Based on BS 8233: 2014 Criterion
	--	L _{AMAX} , 8h, inside 42 dB	Based on Defra Document
Amenity	L _{Aeq} ,16h,outside 55 dB	--	Based on NNGL
LOAEL	L _{Aeq} ,16h,outside 56 dB	L _{Aeq} ,16h,outside 46 dB	Based on Defra AECOM Report
SOAEL	L _{Aeq} ,16h,outside 66 dB	L _{Aeq} ,16h,outside 56 dB	

The above criterion assumes the windows are closed but that one of the four ventilation strategies is in place providing the required ventilation rates to comply with schedule F of the current Building Regulations 2010. However, for robustness an assessment is also undertaken assuming the windows have been opened for ventilation.

6. ProPG Stage 1 Site Noise Risk Assessment ...

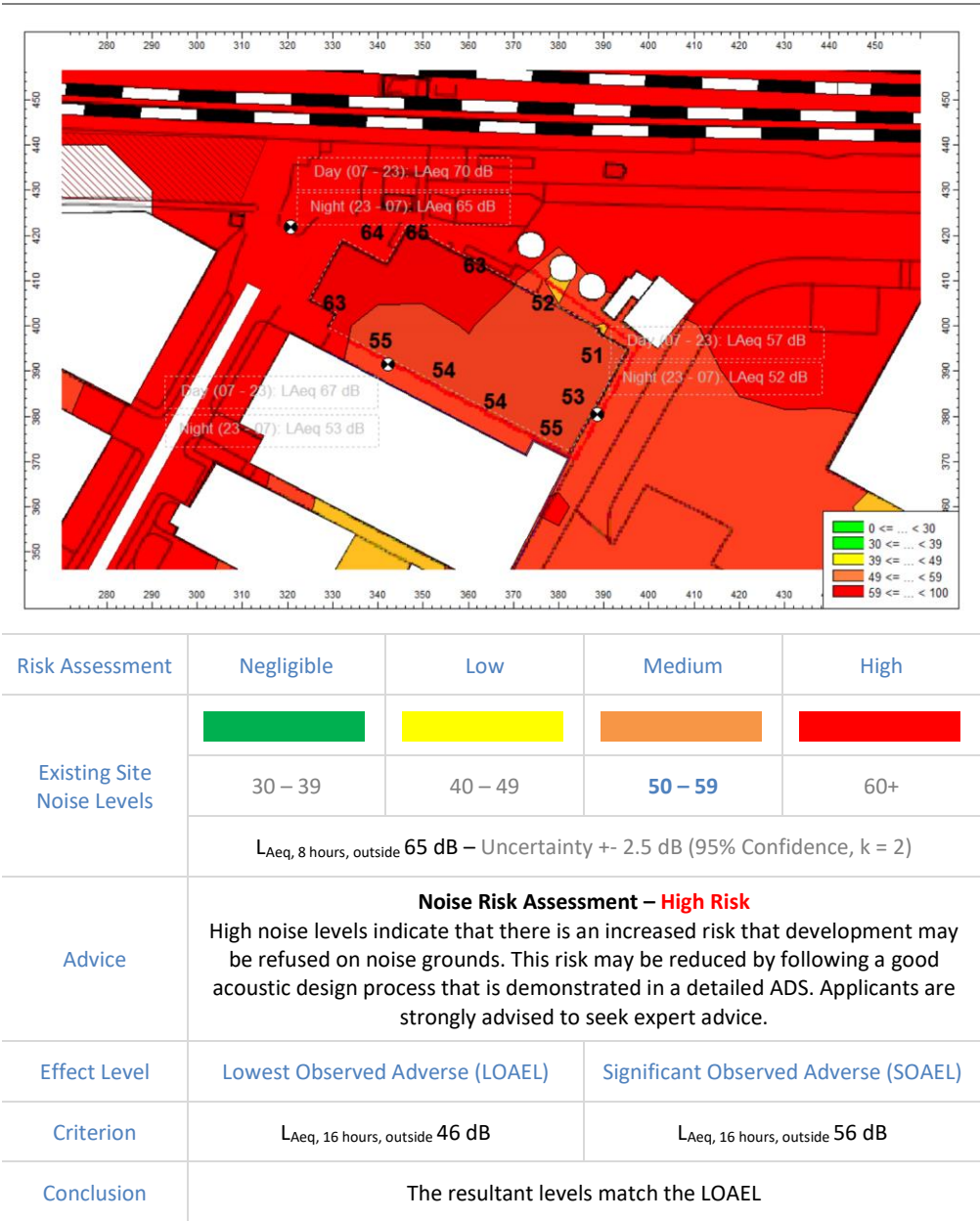
6.1.1 Day Time Site Noise Levels (07:00 to 23:00)



Risk Assessment	Negligible	Low	Medium	High
Existing Site Noise Levels				
	40 – 49 dB	50 – 59 dB	60 – 69 dB	70+ dB
	L _{Aeq} , 16 hours, outside 71 dB – Uncertainty +/- 2.5 dB (95% Confidence, k = 2)			
Advice	Noise Risk Assessment – High Risk High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice.			
Effect Level	Lowest Observed Adverse (LOAEL)		Significant Observed Adverse (SOAEL)	
Criterion	L _{Aeq} , 16 hours, outside 56 dB		L _{Aeq} , 16 hours, outside 66 dB	
Conclusion	The resultant levels fall above the LOAEL and SOAEL			

10m Grid at a height of 4m above the ground level

6.1.2 Night Time Site Noise Levels (23:00 to 07:00)



10m Grid at a height of 4m above the ground level

7. ProPG Full Assessment – Four Key Elements...

7.1. Good Acoustic Design Process

7.1.1 Holistic Design Approach

Noise has been considered from the outset with the layout of the proposed residential dwellings to maximise the opportunity for much needed affordable residential dwellings in the area while ensuring the future residents have acceptable living conditions as a result of the noise from the railway lines.

The sketch below shows that the residential balconies and main windows face away from the railway line. The sketch is taken looking from the existing railway car park.

Consideration	Consideration within the Planning Application
Noise Sources	No opportunity to reduce existing noise sources
Building Orientation	Located away from the railway line to the north
Construction Types	Heavy construction method.
Unintentional Impact	The design is unlikely to have any unintentional impact
Alternative Design	There is no alternative design due to the layout of the site



7.2. Internal Noise Levels Guidelines

7.2.1 Calculation Methodology

The calculation methodology defined within *BS EN ISO 12354 – Part 3: 2017* ⁽¹³⁾ entitled *Building acoustics. Estimation of acoustic performance of building from the performance of elements. Airborne sound insulation against outdoor sound* provides a simplified calculation process defined by the following equation:

$$L_{eq,2} \approx L_{eq,ff} + 10 \cdot \log_{10} \left(\frac{A_0}{S} \cdot 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S} \cdot 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} \cdot 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} \cdot 10^{\frac{-R_{rr}}{10}} \right) + 10 \cdot \log_{10} \left(\frac{S}{A} \right) + 3$$

$L_{eq,2}$ = Equivalent sound pressure level internally within the room (dB) – reference $2 \times 10^{-5} \text{Nm}^{-2}$.
 $L_{eq,ff}$ = Equivalent sound pressure level externally outside the room under consideration (dB) – reference $2 \times 10^{-5} \text{Nm}^{-2}$.
 A_0 = Reference absorption area within room of 10m^2 and independent of frequency.
 S_f = Total façade area of room in question (m^2).
 S_{wi} = Area of windows or glazing within the room (m^2).
 S_{ew} = Area of external wall within the room (m^2).
 S_{rr} = Area of the ceiling within the room (m^2).
 S = Total area of elements through which sound enters the room (m^2). i.e. $S = S_f + S_{rr}$
 $D_{n,e}$ = Sound insulation of the trickle vent measured to British Standard 20140 – Part 10: 1992
 R_{wi} = Sound reduction index of the window (dB)
 R_{ew} = Sound reduction index of the external wall (dB)
 R_{rr} = Sound reduction index of the ceiling (dB)
 A = Equivalent absorption of the room under consideration (m) – BS EN ISO 10140 – Part 2

7.2.2 Transmission Loss of Elements

The following are the performance of the elements used within the calculations.

Element	Makeup	R _w (100 - 3150)	125	250	500	1K	2k
Ventilation	MVHR System	D _{ne} 35 dB	35	37	45	46	46
Open Window	NANR116 (0.2m ² Open Area)	D _{ne} 16 dB	14	14	16	14	17
Glazing	10mm float – 16 mm Gap – 6.4 PVB	R _{wi} 42 dB	26	26	38	43	46
Walls	Brick and Blockwork Wall	R _{ew} 51 dB	43	42	45	53	55
Ceilings / Roof	2 x 15mm Soundbloc	R _{rr} 57 dB	42	49	55	60	56

7.2.3 Average Internal Noise Levels – Windows Closed

Period	Day Time (07:00 to 23:00)						Night Time (23:00 to 07:00)					
Octave Frequency	S	125	250	500	1K	2K	S	125	250	500	1K	2k
Façade, L _{eq,ff}	71	68	69	67	65	62	65	62	63	61	59	56
Ventilation, D _{ne} 38 dB	--	35	37	45	46	46	--	35	37	45	46	46
Windows, R _{wi} 40 dB	3.0	26	26	38	43	46	3.0	26	26	38	43	46
Walls, R _{ew} 51 dB	1.0	43	42	45	53	55	1.0	43	42	45	53	55
Ceiling, R _{rr} 57 dB	6.0	42	49	55	60	56	6.4	42	49	55	60	56
Internal Levels, L _{eq,2}	--	68	69	67	65	62	--	35	34	21	16	13
	L _{Aeq} ,16 hours, inside 33 dB						L _{Aeq} ,8 hours, inside 27 dB					

7.2.4 Average Internal Noise Levels – Windows Open

Period	Day Time (07:00 to 23:00)						Night Time (23:00 to 07:00)					
Octave Frequency	S	125	250	500	1K	2K	S	125	250	500	1K	2k
Façade, L _{eq,ff}	71	68	69	67	65	62	65	62	63	61	59	56
Ventilation, D _{ne} 38 dB	--	35	37	45	46	46	--	35	37	45	46	46
Windows, R _{wi} 40 dB	3.0	26	26	38	43	46	3.0	26	26	38	43	46
Walls, R _{ew} 51 dB	1.0	43	42	45	53	55	1.0	43	42	45	53	55
Ceiling, R _{rr} 57 dB	6.0	42	49	55	60	56	6.4	42	49	55	60	56
Internal Levels, L _{eq,2}	--	68	69	67	65	62	--	45	45	41	41	35
	L _{Aeq} ,16 hours, inside 50 dB						L _{Aeq} ,8 hours, inside 44 dB					

7.2.5 Maximum Internal Noise Levels – Windows Closed

Period	Day Time (07:00 to 23:00)						Night Time (23:00 to 07:00)					
Octave Frequency	S	125	250	500	1K	2K	S	125	250	500	1K	2k
Façade, $L_{eq,ff}$	95	76	80	85	89	87	90	71	75	80	84	82
Ventilation, D_{ne} 38 dB	--	35	37	45	46	46	--	35	37	45	46	46
Windows, R_{wi} 14 dB	3.0	14	14	16	14	17	3.0	14	14	16	14	17
Walls, R_{ew} 51 dB	1.0	43	42	45	53	55	1.0	43	42	45	53	55
Ceiling, R_{rr} 57 dB	6.0	42	49	55	60	56	6.4	42	49	55	60	56
Internal Levels, $L_{eq,2}$	--	44	46	40	41	39	--	22	28	20	19	18
	$L_{Max,16}$ hours, inside 50 dB						$L_{Max,8}$ hours, inside 45 dB					

7.2.6 Maximum Internal Noise Levels – Windows Open

Period	Day Time (07:00 to 23:00)						Night Time (23:00 to 07:00)					
Octave Frequency	S	125	250	500	1K	2K	S	125	250	500	1K	2k
Façade, $L_{eq,ff}$	95	76	80	85	89	87	90	71	75	80	84	82
Ventilation, D_{ne} 38 dB	--	35	37	45	46	46	--	35	37	45	46	46
Windows, R_{wi} 14 dB	3.0	14	14	16	14	17	3.0	14	14	16	14	17
Walls, R_{ew} 51 dB	1.0	43	42	45	53	55	1.0	43	42	45	53	55
Ceiling, R_{rr} 57 dB	6.0	42	49	55	60	56	6.4	42	49	55	60	56
Internal Levels, $L_{eq,2}$	--	49	64	59	59	52	--	52	52	47	47	41
	$L_{Max,16}$ hours, inside 73 dB						$L_{Max,8}$ hours, inside 68 dB					

7.2.7 Assessment of Internal Levels

The following table provides an assessment of the internal noise levels against the criterion required to meet the absolute criterion.

Time Period	Day Time (07:00 to 23:00)		Night Time (23:00 to 07:00)	
Measurement Index	Maximum	Average	Maximum	Average
Windows Closed, $L_{eq,2}$	$L_{Max,16}$ hour 50 dB	$L_{Aeq,16}$ hour 33 dB	$L_{Max,8}$ hour 45 dB	$L_{Aeq,8}$ hour 27 dB
Criterion	--	$L_{Aeq,16}$ hour 35 dB	$L_{Max,8}$ hour 42 dB	$L_{Aeq,8}$ hour 30 dB
Compliance	--	Yes	Yes	Yes

The assessment of the internal noise levels calculated in accordance with *BS EN ISO 12354 – Part 3: 2017* (13) indicate compliance with the proposed criterion with the windows closed.

The levels with the windows open, which future occupiers may do on hot summer evenings falls above the proposed criterion. However, in the general context of the site it is considered that these slightly elevated noise levels with the windows open are acceptable.

Time Period	Day Time (07:00 to 23:00)		Night Time (23:00 to 07:00)	
Measurement Index	Maximum	Average	Maximum	Average
Windows Closed, $L_{eq,2}$	$L_{Max,16}$ hour 73 dB	$L_{Aeq,16}$ hour 50 dB	$L_{Max,8}$ hour 68 dB	$L_{Aeq,8}$ hour 45 dB

7.3. External Amenity Area Noise Assessment

7.3.1 External Levels from Noise Maps

The following external amenity levels are calculated from the noise maps.

Period	Day Time (07:00 to 23:00)						Night Time (23:00 to 07:00)					
Octave Frequency	S	125	250	500	1K	2K	S	125	250	500	1K	2k
External Levels, $L_{eq,3}$	--	60	50	48	46	43	--	41	42	42	40	38
	$L_{Aeq,16}$ hours, inside 52 dB						$L_{Aeq,8}$ hours, inside 44 dB					

7.3.2 Assessment of External Levels

Octave Frequency	Day Time (07:00 to 23:00)	Night Time (23:00 to 07:00)
External Levels, $L_{eq,3}$	$L_{Aeq,16 \text{ hours, inside}}$ 52 dB	$L_{Aeq,8 \text{ hours, inside}}$ 44 dB
Criterion	$L_{Aeq,16 \text{ hour}}$ 55 dB	--
Compliance	Yes	--

7.4. Assessment of other Relevant Issues

7.4.1 Compliance with Relevant National and Local Policy

The assessment indicates that in all respects the proposed development will comply with the national and local planning policy with respect to the resultant internal and external noise levels that the future occupants of the proposed dwellings will be exposed to.

7.4.2 Magnitude and Extend of Compliance with ProPG

The site is bounded by a mainline railway line to the north of the site and an industrial site to the south. The railway noise to the north is slightly higher than the industrial noise to the south when the high speed trains are passing and therefore the same treatment will be undertaken on all facades of the development.

The long-term plans for the area indicate that the rest of Viveash Close may also be developed as a residential and therefore this will improve the magnitude of compliance on the site in the future should it go ahead as it removes the commercial properties to the south.

7.4.3 Likely Occupants of the Development

The site is likely to be occupied by tenants or owner occupiers.

7.4.4 Acoustic Design versus Unintended Adverse Consequences

The acoustic design has not resulted in any unwanted adverse consequences. There is adequate parking on site for the resident's cars and there is good access onto the road at the front of the development.

7.4.5 Acoustic Design versus Wider Planning Objectives

In terms of the wider planning objectives the proposed development offers an excellent opportunity to provide much needed residential dwellings in the area which will improve the sustainability of the local community.

7.5. Acoustic Design Statement

7.5.1 Holistic Design Approach

Noise has been considered from the early inception of this design scheme and the resultant scheme offers the best and most practical solution to minimise the effects of adverse noise on the future occupants of the building. Consideration has been given to alternative design solutions and reduces existing sources of noise. An assessment has been undertaken with both the windows closed and open.

7.5.2 Summary Acoustic Design Statement

ADS Element (Low Risk)	Description	Compliance
Noise Sources Identified	Road Noise –Road at front Rail Noise –Northern Boundary Aircraft Noise – Minor Impact	Yes
Noise Risk Unmitigated Site	Alternative site layouts were considered Adequate none sensitive screening	Yes
Opportunities to Mitigate	Positioning of Sensitive Dwellings Use of Building as a Screen	Yes
Maximise Separation	Yes, within the constraints of the site	Yes
Noise Barriers	Good Opportunity to use buildings as barriers.	Yes
Site Layout	Design has incorporated a quiet design strategy	Yes
None Sensitive Screens	None available due to location near road	Yes
Building Layout	No internal layouts not yet considered	n/a
Building Treatment Opening	Not applicable	Yes
Window size and location	No yet considered in design process	n/a
Ventilation Quiet Facades	Yes – MVHR should not terminate on north facade	Yes
Recommendation:	<i>"B: Planning consent may be granted subject to the inclusion of suitable noise conditions"</i>	

8. Conclusions and Discussions of Results...

8.1. Recommended Constructions

It would be recommended that the development is undertaken with the following elements incorporated within the design.

- Glazing: Standard Double Glazed Unit (10mm float – 16mm Gap – 6.4 PVB)
- Ventilation: Full MVHR system to comply with Approved Document F.
- Walls: Standard brick and block walls.
- Ceiling: Top floor flats will need 2 x 15mm soundbloc plasterboard in the ceiling.

8.2. Compliance with Criterion

The proposed development will result in acceptable internal and external noise levels for the future occupants of the residential dwellings. The development complies in full with national and local planning policy and there are no noise related issues why planning permission can't be granted for this sustainable development.

The development complies in full with the proposed criterion which is based on *British Standard 8233: 2014* ⁽⁷⁾ and other relevant documents to determine the Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL) defined within the *National Planning Policy Framework* ⁽¹⁾.

8.3. Discussion of Results

An assessment has been undertaken with the windows closed and open to form part of the whole holistic approach to the acoustic design. With the windows closed the criterion are easily met with the ventilation rates for each room being met to provide dispersal of pollutants including water and CO₂. The thermal comfort of residents should be maintained as the building will need to comply with Approved Document L.

This report provides the additional information referenced in the planning officers report justifying the delegated decision by providing details of the surrounding commercial uses and the maximum noise levels which are likely to impact the proposed site. These additional assessments have not changed the conclusion of the original report that in terms of noise the site is an acceptable location for residential development.

The delegated officers report mentions the noise from car services but these are more than 50m from the site and will have significantly less impact than railway line to the north and the commercial unit operated by Paramount Powders adjoining the southern boundary of the site.

For reference the following car servicing garages were identified in Viveash Close:

- Unit 1 Squirrels Trading Estate – MDI Motor Services Ltd
50m from southern boundary with Paramount Powders creating an extensive barrier with the proposed site.
- GT Morots on the other side and recessed behind Symphony House
50m from the south western boundary with Symphony House creating an extensive barrier with the proposed site.
- Auto Action Gearbox Centre around 60m from the south western boundary of the site.

Furthermore, it is very unlikely that any of these garages would undertake noisy activities externally. At worst these facilities would operate with the doors open and due to the distances involved, the local topography and the barrier effect of the existing buildings their operations will not have a detrimental effect on the site which is greater than the railway line or Paramount Powders.

END OF DOCUMENT

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Quietly **Confident...**

